units he has been introduced to, is it safe to bring another under his notice.

Many interesting cases of motion are well expounded and illustrated by diagrams, for example the motion of a pendulum with a gyrostat in its bob (a case of great importance in other branches of physics), and the precession of the equinoxes.

The statics and kinetics of fluids are next dealt with, and, as was to be expected, fluid motion is well attended to. Wave motion of a fluid and the principle of Huyghens are here discussed and well illustrated graphically. Then follows a wonderfully complete account, for the space devoted to it, of molecular phenomena of solids and fluids, including a sketch of the kinetic theory of gases.

The second half of the book, which deals with acoustics and optics, we have not space to speak of in any detail. Throughout we have clear description of phenomena, of apparatus, and of experimental processes, always with neat and truthfully-drawn diagrams. There is necessarily very little in the way of mathematical exposition of these subjects, but the results of mathematical and experimental investigation are clearly stated, and the book cannot but form an exceedingly useful introduction to an extended course of physical study, such as that for which one of the more elaborate Lehrbücher, which have lately appeared in Germany, might form a basis. It is very clearly printed, and, what is a great thing in a text-book, the numerous cuts have been very well engraved and printed.

A. GRAY.

TRAVELS AMONG THE HAUSA.

Hausaland, or Fifteen Hundred Miles through the Central Soudan. By Charles Henry Robinson, M.A. Pp. 304. Map and illustrations. (London: Sampson Low, Marston, and Co., 1896.)

MR. J. A. ROBINSON, the brother of the author of the book before us, died at Lokoja on the Niger in 1891, while engaged in the study of the Hausa language, and in his memory the Hausa Association was formed in the same year with a view to carry on the work. Mr. C. H. Robinson was selected by the Association as their first "Hausa Student," and he left England at the end of April 1893, to make acquaintance with the language, and also to learn Arabic. Instead of proceeding directly to the land of the Hausas, the climate of which at the best is very trying for Europeans, he went successively to Tripoli and Tunis, where he had opportunities of conversing with many of the Hausa pilgrims on their way from the interior of the Sudan to Mecca, and with any number of Hausa slaves.

Equipped by preliminary training in the language, and accompanied by two friends, Dr. T. J. Tonkin and Mr. John Bonner, Mr. Robinson reached Lokoja, at the confluence of the Niger and Benue, in August 1894; and, after wearisome delays in obtaining carriers, set out for Kano, the commercial capital of the Hausa states. They travelled up the Benue to Loko, then struck northwards by land through Kaffa and Zaria, and reached Kano on December 23. Here the party stayed for rather more than three months, engaged in diligent study, and then returned to the Niger and to Europe.

Hausaland is not a defined geographical area, but a group of native states occupying the fertile region of the Western Sudan between the territory of the Royal Niger Company (to which they are tributary) and the Sahara desert. Sokoto is the predominant state, but the chief town of the Hausas is Kano, a trade-centre of such importance that Mr. Robinson does not hesitate to dub it the "Manchester of the Soudan." The town is described in some detail, and this description is perhaps the most important feature of the book, which in other parts suffers from "padding," including long extracts from various writers on non-essential subjects. Kano is estimated to contain about 100,000 inhabitants; it manufactures much cloth, which is largely exported, and may be purchased in Alexandria, Tunis, or Lagos, so widely are its qualities appreciated. The markets also contain European goods, which are still, for the most part, brought across the Sahara from Mediterranean ports. The Hausas are born traders, and having acquired Mohammedan education, are by no means to be viewed as savages. They are, however, inveterate slave-traders; and Mr. Robinson is of opinion that this trade cannot be seriously combated until a satisfactory currency and mechanical means of transport are introduced. At present slaves are the larger, and cowries the smaller, units of value; and as a slave is worth several hundred thousand cowries, the carriage of his value in these shells would tax the resources of any caravan. There is one coin which passes current through the whole of Northern Africa—perhaps the last in Europe which would occur to any one set to guess its nationality and date—the silver Austrian thaler coined in 1780 during the reign of Maria Theresa. Mr. Robinson urges a large importation of these coins as a measure to promote trade and discourage slavery. He has shown himself to be a diligent student and a good observer, although a somewhat diffuse writer, and the suggestion is worthy of consideration.

In the preface we are told that the Royal Geographical Society's system of spelling place-names has been followed; but this is only done in part. The French transliterations are used in some cases, and also other forms—as, for example, Abutshi, Bornou, Gandja, Soudan, Tchad; where the system referred to would require—Abuchai, Bornu, Ganja, Sudan, Chad.

It is to be hoped that the efforts of the Hausa Association will not be allowed to cease for want of money; for Mr. Robinson's linguistic work is of real value, and its importance will appear more fully when the facsimiles and translations of the Hausa MS. which he has brought home, together with his dictionary and grammar of the language, are published.

OUR BOOK SHELF.

Practical Mechanics, applied to the Requirements of the Sailor. By Thomas Mackenzie, Master Mariner, F.R.A.S., &c. Pp. xii + 175. (London: Charles Griffin and Co., Ltd., 1896.)

THIS book is one of a very useful series on nautical subjects, published in order to meet a desire on the part of the officers of the Mercantile Marine to obtain a more scientific insight into the principles of their profession.

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It is becoming more generally recognised that the really "practical" man is the one who combines practical knowledge and experience with intelligent appreciation of underlying principles.

The aim of the book is to lay before sailors, in an easily comprehended manner, the principles on which the various mechanical devices employed by them are founded.

A large amount of useful information has therefore been gathered together in the small compass of this book, and rules and principles whose *general* application is explained in various text-books on practical and applied mechanics, are here specially adapted to the requirements of the sailor. To mention a few instances: we find explanations of the mechanical advantage gained by the various tackles and purchases; the construction of derricks and shears, and the weight they will support; the relative strengths of ropes; the breaking strains of spars; the floating power of spars and casks, and the weight which a raft, constructed of given materials, will bear; the effect of the wind on the sails in driving the ship ahead and in causing leeway; the effect of the water on the rudder; the extra strain thrown on slings when a ship is rolling, &c.

The principles of the composition and resolution of forces, and of the mechanical powers are somewhat fully explained in the opening chapters, and the idea of applying the traverse table, so familiar to all sailors, to the solution of the problems, is an excellent one; but more explanation of some of the rules given later, which have to be taken for granted, could be desired, as it is very difficult to retain bare rules in the memory.

The size of the book no doubt imposed limits on the amount of space to be devoted to explanation, but it provides, nevertheless, an excellent book of reference; and though it may not be necessary to make some of the calculations referred to, it is always useful to know how things are worked, and on what principles, and that the principles are in accordance with well-known physical laws. "A sailor is so often thrown on his own resources, and the more exact his knowledge is of natural forces, the more readily can he avail himself of the forces at hand."

The book contains several valuable tables, and a useful collection of rules in mensuration.

F. C. STEBBING.

Power Locomotion on the Highway. By Rhys Jenkins, M.I.Mech.E. Pp. 64. (London: William Cate, Ltd., 1896.)

THE sub-title of this publication sufficiently expresses the character of the contents; it is "a guide to the literature relating to traction engines and steam rollers and to the propulsion of common road carriages and velocipedes by steam and other mechanical power, with a brief historical sketch." The historical sketch is a concise statement of the lines along which progress in power locomotion on common roads has proceeded. Following it is a bibliography of works on mechanical carriages and traction engines, a catalogue of papers read before, or appearing in the Transactions of, scientific and technical societies, indexed under names of authors, a list of journals devoted to the mechanical carriage movement, and an index to articles on the subject in periodical literature up to the end of 1895. The periodicals indexed include those of the United States, France, and Germany, as well as of Great Britain. The author has evidently been at considerable pains to prepare his descriptive index, and his efforts deserve encouragement. It would be an immense boon if indexes of the same description were available for other branches of technology. The reception afforded to this little book will show whether the demand is sufficient to justify the publication of others of a like kind.

LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, or to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Utility of Specific Characters.

I REGRET very much that I did not correctly remember, when writing to NATURE a month ago, what my friend Mr. Thiselton-Dyer had said at the Linnean Society's meeting. I suppose that in consequence I must not greatly complain that whilst telling us what he really did say, my friend has taken the opportunity to present a version of my views which is far from accurate. He has less excuse than I had in attempting to cite his remarks, since he has before him my printed letter of July 16. This fact also renders it easy to show wherein he is inaccurate.

I suppose that we are all agreed that it is in the highest degree interesting to know what Mr. Darwin himself thought and said on questions of the kind now under discussion. At the same time, we are none of us, I imagine, likely to attribute to Mr. Dyer a special knowledge either of Darwin's writings or of their interpretation which we do not share. Naturalists are, I believe, not prepared to accept any individual as the authoritative exponent of Mr. Darwin's teaching. Under these circumstances it is to me a matter for regret that a plain discussion of the question whether specific characters are invariably useful should be turned into a dispute as to whether the person who suggests some special application of Mr. Darwin's doctrines, or advances some subordinate hypothesis in relation to their application, can or can not be solemnly regarded as an Orthodox Darwinian. Mr. Dyer says that the Darwinian theory seems hardly to have a convinced supporter left except Mr. Wallace. He denounces my quotations from Mr. Darwin's own books as to correlation of variation as a "difficulty" brought up by me "against" the Darwinian theory; then, without more ado, assumes the *rôle* of apostle of the Darwinian theory (a part to which I cannot allow him any exclusive claim), and proceeds to tell us what "will" be found in the twenty-fifth chapter of Mr. Darwin's "Animals and Plants under Domestication," viz. that Darwin has said pretty much all that can (as yet) be said about the facts of correlation of variation. The attempt on Mr. Dyer's part to represent my citation of Mr. Darwin's own conclusions in regard to correlation of variation as unorthodox, is a little beside the mark. No one is ignorant that it "will" be found that in the chapter cited Mr. Darwin discusses "correlation"; not only that, but it *has been* so found long ago and repeatedly by many other readers besides Mr. Dyer. I expressly stated, both at the Linnean Society and in my letter printed in NATURE on July 16, that I was quoting from Mr. Darwin both as to Wells and as to other instances.

Perhaps the most unsatisfactory feature in Mr. Dyer's claim to classify his friends as heterodox and orthodox in regard to Darwinism, is that it leads him to undertake to give away the Darwinian theory. "I frankly admit," he says, "that such a case [a case of correlated variation such as that hypothetically stated by me] if completely established would give the utility of specific characters, and with it the Darwinian theory, a serious blow." I do not value this frank admission. If Mr. Dyer feels constrained to admit to some one that such a case would give a serious blow to the Darwinian theory, he must not come to me with his "admission" of a "point scored"; for I neither admit that any such blow is given, nor can I accept Mr. Dyer's good-natured offer to act as representative of the Darwinian theory. All that my friend can represent in this matter is the Dyerian theory of Mr. Darwin's theory. Mr. Darwin never asserted in so many words that specific characters are invariably "useful," and in my judgment he did not hold that opinion. But whether he did or did not, that opinion can not, I think, be shown to be a necessary outcome of the theory of natural selection, provided that we take into consideration important ascertained properties of living matter. My impression is that Mr. Wallace—whom Mr. Dyer has declared to be the only convinced supporter of the Darwinian theory now left—stated at the Linnean Society that he agreed with me as to "correlated variation" sometimes accounting for a specific character which accordingly could not be regarded as due to utility. Such also I gathered was the view of Mr. Meldola. Yet neither of these gentlemen regarded this conclusion as a serious blow to the Darwinian

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